

DIRECT TESTIMONY OF

HENRY E. DELK, JR.

ON BEHALF OF

DOMINION ENERGY SOUTH CAROLINA, INC.

DOCKET NO. 2020-2-E

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND POSITION WITH DOMINION ENERGY SOUTH CAROLINA, INC. (“DESC” OR “COMPANY”).

A. My name is Henry E. Delk, Jr., and my business address is 220 Operation Way, Cayce, South Carolina 29033. I am employed by DESC as General Manager, Fossil Hydro Operations.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND YOUR BUSINESS EXPERIENCE.

A. I graduated from Clemson University in 1993 with a Bachelor of Science degree in Mechanical Engineering and earned a Master of Business Administration from the University of South Carolina in 2000. I began my career with Milliken & Company in 1993 working as a Process Improvement Engineer. After three years, I accepted a position with Clariant Corporation as a Project Engineer. I began my career with DESC, then South Carolina Electric & Gas Company, in 1997 in the

1 Rate Department as a Rate & Regulatory Specialist. In 2000, I transferred to
2 Electric Transmission and assumed a position within the System Control department
3 as a System Controller. Within Electric Transmission, I served as
4 Supervisor/Manager of Operations Planning from 2001 to 2007 and Manager of
5 System Control from 2007 to 2012. I transferred to the Electric Operations division
6 in 2012 to 2013 working as Manager of Northern Division Transmission Operations
7 and Local Manager of the Lexington and Chapin Crew Quarters. From 2013 to
8 2014, I served as Director of Power Marketing. I assumed the role of General
9 Manager, Fossil Hydro Technical Services in June 2014. In September 2017, I
10 assumed my current position as General Manager, Fossil Hydro Operations.
11

12 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

13 A. The purpose of my testimony is to review the operating performance of
14 DESC's Fossil Hydro units and South Carolina Generating Company's ("GENCO")
15 A.M. Williams Electric Generating Station ("Williams Station") during the period
16 January 1, 2019, through December 31, 2019 ("Review Period").
17

18 **Q. PLEASE GIVE A SHORT DESCRIPTION OF DESC'S FOSSIL AND**
19 **HYDROELECTRIC FACILITIES.**

20 A. DESC currently operates three coal-fired steam units, one dual fuel (coal
21 and/or natural gas) steam unit, three gas-fired steam units, 11 combined-cycle

combustion turbine/steam generator units (gas/oil fired), 16 simple cycle combustion turbines, four hydroelectric generating facilities, and one pumped storage facility. The total net non-nuclear summer and winter generating capability rating of these facilities is shown in Table 1 below. The ratings shown therein are updated on an annual basis.

Table 1

DESC Power Generation Capacity - Net Megawatts		
	Summer Rating	Winter Rating
Combined Cycle	1,829	1,994
Coal-Fired Steam	1,289	1,294
Dual-Fuel Coal and/or Gas-Fired Steam	415	415
Gas-Fired Steam	345	346
Simple Cycle Combustion Turbines	339	399
Hydroelectric	208	224
Pumped Storage Hydroelectric	576	576
Total	5,001	5,248

Q. DOES DESC OPERATE RENEWABLE GENERATORS?

A. Yes. DESC also owns and operates a thin film laminate solar generation system on ten acres of rooftop at Boeing's North Charleston production facility. This system has a DC nameplate rating of 2.6 MW.

Q. PLEASE DESCRIBE GENCO AND ITS RELATIONSHIP TO DESC.

A. GENCO owns Williams Station and was incorporated on October 1, 1984, as a SCANA subsidiary. GENCO sells to DESC the total capacity and entire output

1 from the Williams Station under a Unit Power Sales Agreement approved by the
2 Federal Energy Regulatory Commission. For purposes of this testimony, I include
3 Williams Station when I refer to DESC's coal-fired steam plants.
4

5 **Q. HOW MUCH ELECTRICITY WAS GENERATED BY DESC IN THE**
6 **REVIEW PERIOD?**

7 A. In the Review Period, DESC generated 23,719,708 megawatt hours
8 ("MWH") of energy. Of this energy, the coal-fired steam units and the dual fuel
9 steam unit (Cope Station) when fired by coal generated approximately 23.6%, the
10 combined-cycle units generated approximately 42.8%, the nuclear plant generated
11 approximately 23.2%, the gas-fired steam units (Urquhart Unit No. 3 and
12 McMeekin Unit Nos. 1 & 2) and the dual fuel steam unit when fired by natural gas
13 generated approximately 7.1%, the peaking gas turbines and hydro units generated
14 approximately 3.3%, and the DESC-owned solar generation facility generated less
15 than 1%. By fuel, natural gas and fuel oil accounted for 50% of the total energy
16 generated, coal accounted for 23.6%, nuclear accounted for 23.2%, hydropower
17 accounted for 3.2%, and DESC-owned solar accounted for less than 1%. Exhibit
18 No. ____ (HED-1) provides a graphic display of how the Company's generation met
19 our customers' demand for energy during this Review Period by generating unit
20 type and by fuel utilized.
21

1 **Q. PLEASE SUMMARIZE THE PERFORMANCE OF THE FOSSIL HYDRO**
2 **UNITS.**

3 A. DESC's Fossil Hydro units operated efficiently and dependably during the
4 Review Period. DESC's coal-fired and natural gas-fired steam units and combined-
5 cycle units (hereinafter collectively, "fossil units") had an availability factor of
6 85.75% with an availability during the peak demand months of January, February,
7 June, July, August, and December of 94.64%.

8 During the Review Period, DESC's fossil units had a forced outage factor of
9 1.03%. The "forced outage factor" is the percentage of the total hours that
10 generating units are forced out of service (for various reasons) compared with the
11 number of hours in the period.

12
13 **Q. PLEASE DISCUSS THE SIGNIFICANT PROJECTS UNDERTAKEN**
14 **DURING DESC'S MAINTENANCE OUTAGES FOR THE REVIEW**
15 **PERIOD.**

16 A. As part of the Company's ongoing maintenance program, DESC undertook
17 a number of significant projects during its maintenance outages in this Review
18 Period. A brief description of major work is as follows:
19

Wateree Station – Spring 2019

Wateree Station completed a scheduled seven-week outage on Unit 1 and a 12-week scheduled outage on Unit 2 during Spring 2019. The major work completed during this outage included, among other things, the following:

- High/intermediate/low pressure main steam turbine inspections on Unit 2,
- Main steam turbine valve inspections on Units 1 and 2,
- Boiler water wall tube replacements on Unit 2,
- Feedwater heaters #3 and #8 replacements on Unit 2,
- Furnace wall sootblower replacement on Unit 2,
- Continuous emission monitoring system and nitrous oxide emissions monitoring system hardware/software replacements on Unit 2,
- Selective catalytic reduction catalyst replacement on Unit 2,
- Wet flue gas desulphurization scrubber inspection, and
- High energy piping inspections for Units 1 and 2.

Wateree Station - Fall 2019

Wateree Station completed a 12-week scheduled outage on Unit 1 and a seven-week scheduled outage on Unit 2 during Fall 2019. The major work completed during this outage included, among other things, the following:

- Boiler water wall tube replacements on Unit 1,
- Boiler feed pump turbine Technical Information Letter upgrades on Unit 1,
- Asbestos abatement and insulation replacement in the Unit 1 turbine building and Unit 2 deaerator heater and storage tank,
- Coal handling system refurbishment,
- Wet flue gas desulphurization scrubber inspection and absorber recycle pump suction screen installation, and
- Units 1 and 2 and common distributed control system software and human machine interface upgrade.

Williams Station - Fall 2019

Williams Station completed an eight-week scheduled outage during Fall 2019. The major work completed during this outage included, among other things, the following:

- Boiler center wall and superheat platen pendant tube replacements,
- Main generator hydrogen cooler replacement,
- Selective catalytic reduction catalyst replacement,
- Station inverter and battery charger replacement,
- High energy piping inspections, and
- Installation of a new generator step up (GSU) transformer unit.

McMeekin Station – Fall 2019

McMeekin Station completed a six-week scheduled outage during Fall 2019. The major work completed during this outage included, among other things, the following:

- Low pressure steam turbine rotor replacement and valve inspection on Unit 2,
- Boiler inspection on Units 1 and 2,
- Emergency motor control center replacement on Units 1 and 2, and
- High energy piping inspections on Units 1 and 2.

Q. PLEASE DISCUSS ANY SIGNIFICANT FORCED OUTAGES FOR THE PERIOD UNDER REVIEW.

A. DESC's Fossil Hydro Operations defines a significant forced outage as any forced outage in excess of seven days. Fossil Hydro had two significant forced outages during the Review Period:

Urquhart Unit 3

Urquhart Unit 3 experienced a forced outage lasting approximately nine days from February 24, 2019, to March 5, 2019. Generator seal oil was leaking into the generator, and the decision was made to shut the unit down due to the volume of oil being drained from the generator hydrogen system. Both seal oil regulators were replaced, and the unit was returned to service.

McMeekin Unit 1

McMeekin Unit 1 experienced a forced outage lasting approximately 11 days from April 6, 2019, to April 17, 2019. Due to flow accelerated corrosion, the #2 feedwater heater drain line failed. The piping was replaced with upgraded Grade 22 piping material to prevent future failure from the same mechanism and the unit was returned to service.

Q. WHAT WAS DESC'S FOSSIL SYSTEM FORCED OUTAGE FACTOR FOR THE PERIOD UNDER REVIEW?

A. For the Review Period, DESC's fossil units experienced a system forced outage factor of 1.03%. DESC's forced outage factor of 0.79% for coal-fired units was much better than the five-year (2014-2018) national average of 5.09% for forced outage factors on all coal-fired units as reported by the North American Electric Reliability Council ("NERC") Generating Availability Data System database. DESC's forced outage factor of 0.76% for its combined-cycle units was

1 much lower than the five-year (2014-2018) NERC national average for combined-
2 cycle units of 2.34%. DESC's gas-fired steam units forced outage factor of 2.34%
3 for the Review Period was much better than the five-year (2014-2018) NERC
4 national average of 5.25% for gas-fired steam units.

5
6 **Q. PLEASE DISCUSS THE AVAILABILITY OF DESC'S FOSSIL PLANTS**
7 **DURING THE REVIEW PERIOD.**

8 A. Availability factor is a measure of the actual hours that the generation units
9 are available (overall readiness to provide electricity) divided by the total hours in
10 the Review Period. Availability is not affected by how the unit is dispatched or by
11 the demand from the system when connected to the grid. However, it is impacted
12 by the planned and unplanned shutdown hours. DESC's fossil units had an
13 availability factor of 85.75% during the Review Period. For comparison purposes,
14 the five-year (2014-2018) NERC national average for availability from all coal-fired
15 units was 83.0%, and DESC's availability for its coal-fired units for 2019 was
16 72.5% primarily due to lengthy planned outage work at Wateree during both the
17 Spring and Fall and the planned outage work at Williams during the Fall. DESC's
18 combined-cycle availability factor of 91.55% was much better than the five-year
19 (2014-2018) NERC national average for combined-cycle units of 87.91%. DESC's
20 gas-fired steam units' availability factor of 82.14% for the Review Period was in

1 line with the five-year (2014-2018) NERC national average of 81.62% for gas-fired
2 steam units.

3
4 **Q. PLEASE EXPLAIN “HEAT RATE” AND DESCRIBE THE HEAT RATE OF**
5 **THE NATURAL GAS-FIRED COMBINED CYCLE UNITS AND THE**
6 **COAL-FIRED STEAM UNITS DURING THE REVIEW PERIOD.**

7 A. Heat rate is a way to measure the thermal efficiency of a power plant. It is
8 the number of British Thermal Units (“Btu”) of fuel required to generate one
9 kilowatt-hour (“kWh”) of electricity. Simply put, the lower the heat rate, the more
10 efficient the plant.

11 The natural gas-fired combined cycle unit average system heat rate for the
12 Review Period was 7,416 Btu/kWh. Columbia Energy Center had the best heat rate
13 on our system at 7,226 Btu/kWh. The most recent data published by the United
14 States Energy Information Agency (“EIA”) indicates that the national average heat
15 rate for all natural gas-fired units in 2018 was 7,822 Btu/kWh.

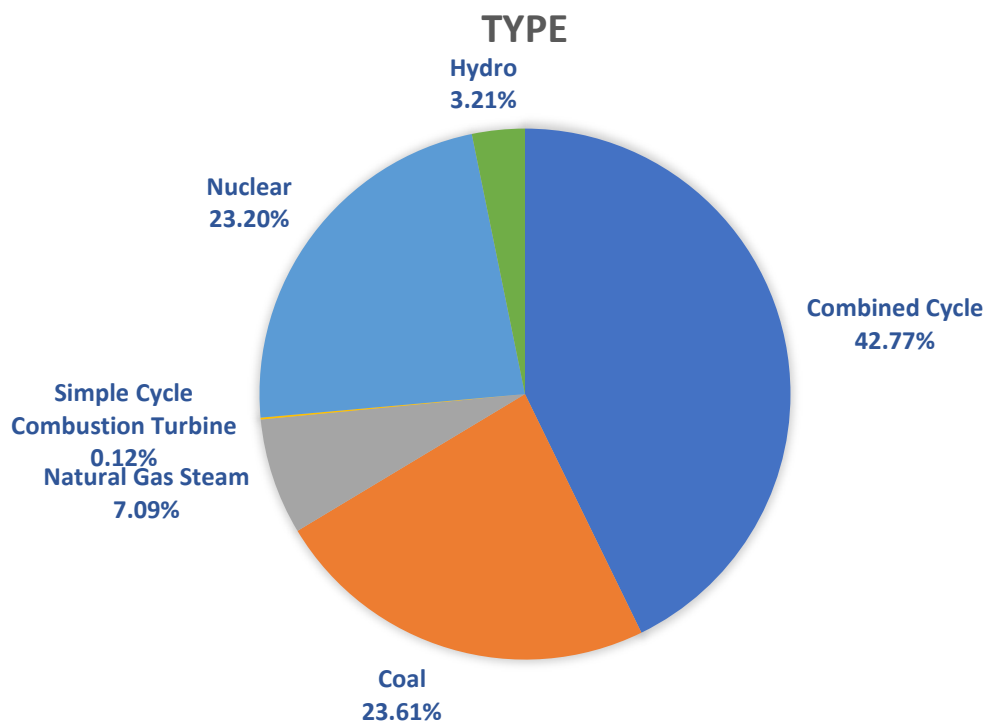
16 The coal-fired steam unit average system heat rate for the Review Period was
17 10,141 Btu/kWh. Wateree Unit 1 had the best heat rate for a coal-fired unit on our
18 system at 9,967 Btu/kWh. For comparison purposes, the most recent data published
19 by EIA indicates that the national average heat rate for all coal-fired units in 2018
20 was 10,514 Btu/kWh.

1 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

2 A. Yes.

Exhibit No. __ (HED-1)

2019 DESC OWNED GENERATION OUTPUT BY UNIT



2019 DESC OWNED GENERATION OUTPUT BY FUEL

